5. Individual Income Tax Model

5.1. Introduction

MINT' s income projections, as produced by The Urban Institute, represent pre-tax income flows through the year 2031 (Toder et al., 1999). SSA' s DPE wants to have the ability to project after-tax poverty rates and to evaluate after-tax consequences of reform proposals. To that end, RAND developed an individual income tax model.[45]

This chapter documents this income tax model. Also see Klerman and Panis (1999). The model consists of a SAS macro that approximates the federal and state taxes corresponding to the profile of income provided by the main SSA MINT model. We begin by describing how to use the macro. We then discuss the assumptions behind the model and how to modify if (or when) the tax code changes.

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[45] We gratefully acknowledge substantial expert input from Jacob Klerman in the development of the tax model.

5.2.   Model Input and Output

The taxation model consists mainly of a SAS macro, `%computax` It takes two formal input arguments and returns three output arguments. It assumes the existence of many (income, marriage, and demographic) variables, and requires that several arrays and formats have been declared—see below.

This macro takes as formal input:

- `year` the year (four digits) for which taxes need to be computed. This argument may be a number (such as 2020) or a variable name (such as year);
- `assetinc` the name of the *array* containing asset income variables. Needed to allow for asset income on the basis of multivariate as well as unisex lifetables.

and provides as output:

- `fedtax` federal income taxes. This argument must be a variable name;
- `ficatax` Federal Insurance Contributions Act (FICA) taxes, i.e., the sum of Old-Age, Survivors, Disability (OASDI), and Hospital Insurance (HI) taxes. This argument must be a variable name;
- `statetax` total sub-federal taxes, including state income and sales taxes and sub-state taxes (e.g., county and local income, sales, property, and use taxes). This argument must be a variable name.

Each of these three tax variables corresponds to the year and profile of income as defined in the current observation of the MINT data.

5.2.1. A Simple Example

The tax model may be best illustrated using a sample program. Assume that the MINT data set is `mint.sd2`and located in the same directory as the following program:[46]

```
1     libname in  '.';
2
3     %include 'cpi.sas';      /* CPI series      */
4     %include 'ssawage.sas';  /* SSA wage series */
5     %include 'marstat.sas';  /* macro to figure out marital status */
6     %include 'computax.sas'; /* macro to compute taxes */
7
8     data new;
```

[46] The line numbers on the far left of the listing are not part of the code. They are included to ease description of the code. They do not appear in the actual source code.

```
 9          set in.mint;
10
11          array howend(*)  howend1-howend12;
12          array marb(*)    marb_1-marb_12;
13          array mare(*)    mare_1-mare_12;
14          array spbdate(*) spbdat1-spbdat12;
15
16          array inde(1990:2031) inde1990-inde2031;
17          array sern(1990:2031) sern1990-sern2031;
18          array hpen(1990:2031) hpen1990-hpen2031;
19          array spen(1990:2031) spen1990-spen2031;
20          array inci(1990:2031) inci1990-inci2031;
21          array incu(1990:2031) incu1990-incu2031;
22          array ssb(1990:2031)  ssb1990-ssb2031;
23          array sssb(1990:2031) sssb1990-sssb2031;
24
25          /* Compute the tax liability for the year 2020 using  */
26          /* asset income from multivariate lifetables:         */
27          %computax(2020,inci,federal,fica,state);
28
29     run;
```

Line 1 identifies the location of the data and programs.

Lines 3-6 include external files into the program. The first file, `cpi.sas`, contains SAS code with a proc format that defines format `cpi`. This format is used to conveniently map years into the corresponding (projected) Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI). This format is required by the tax model macro. See Appendix B.1 for a listing of `cpi.sas`.

The second included file, `ssawage.sas`, contains SAS code with a `proc format` that defines format `ssawage`. This format is used to conveniently map years into the corresponding (projected) Social Security average wage. All monetary amounts in the MINT income and asset projections are relative to the Social Security average wage. This format is required by the tax model macro. See Appendix B.2 for a listing of `ssawage.sas`.

The third included file, `marstat.sas`, contains SAS code which defines macro `marstat`. This macro is required by the tax model macro to determine an individual' s marital status as of the end of the tax year. See Appendix B.3 for a listing of `marstat.sas`.

The fourth included file, `computax.sas`, contains SAS code which defines macro `computax`. This macro computes tax liabilities and is the main component of the MINT tax model. See Appendix B.4 for a listing of `computax.sas`.

Lines 11-14 declare arrays which are required by `marstat` and `computax`. They presume the existence in `mint.ssd01` of the following variables:

- `howend1-howend12`: disposition of marriages;

- `marb_1-marb_12` wedding dates;
- `mare_1-mare_12` end dates of marriages;
- `spbdat1-spbdat12` birth dates of spouses.

Lines 16-23 declare additional arrays which are required by `marstat` and `computax` They presume the existence in `mint.ssd01` of the following variables:

- `inde1990-inde2031` respondent earnings
- `sern1990-sern2031` spousal earnings
- `hpen1990-hpen2031` respondent defined benefit pensions
- `spen1990-spen2031` spousal defined benefit pensions
- `inci1990-inci2031` annuitized asset income (multivariate lifetables)
- `incu1990-incu2031` annuitized asset income (unisex lifetables)
- `ssb1990-ssb2031` respondent Social Security benefits
- `sssb1990-sssb2031` spousal Social Security benefits

Line 17 calls macro `computax` which computes tax liabilities. In this example, liabilities for calendar year 2020 are computed using asset income from multivariate lifetables. Three new variables are created, corresponding to federal income tax (`federal`), FICA taxes (`fica`), and state and local total taxes (`state`).

Notes:

1. The year input argument may be either a number (such as 2020) or a variable name. Only years 1990 through 2031 are supported.

2. The asset income argument must be the name of an array, as defined by the user.

3. The three tax liability output arguments must be variable names, chosen by the user.

4. To compute tax liabilities of income flows including asset income based on unisex lifetables, specify `incu` as the second argument.

5.3. Model Assumptions

Income tax laws are very complicated and many potentially relevant details are unknown to the MINT user, especially in future years. We therefore make a number of simplifying assumptions. The most important assumptions are:

- Respondents that are unmarried as of the end of the year file a single tax return; married respondents file a joint tax return. There is one exception: individuals who have become widowed during the reference year and who did not remarry in that year file as married.

- There are no dependent children for whom an exemption may be claimed (line 6).

- There is no income from unemployment compensation (line 12).

- No deductible IRA contributions are made (line 15).

- No student loan interest deduction may be made (line 16).

- Respondents take the standard deduction, i.e., do not itemize expenses. There are no deductible medical savings account contributions, moving expenses, penalties on early withdrawal of savings, alimony expenses, or other expenses which affect Adjusted Gross Income (AGI). The standard deduction takes account of the respondent's (and spousal) age, but we assume that he/she is not blind.

- Respondents are not eligible for tax credits due to disability, child care, education, adoption, foreign tax payments, or other factors. They may, however, be eligible for the tax credit for the elderly (line 27).

- To the extent that there is earned income, we assume that the taxpayer is an employee, i.e., FICA taxes do not include the employer portion. Also, there are no deductible self-employment taxes and no contributions to Keogh or other self-employed Defined Contribution (DC) pension plans.

- Each tax year may be considered independently of other years, i.e., there is no carry-over of income across fiscal years.

The MINT simulation data contain information on projected income flows from four major categories: earned income, defined benefit (DB) pension income, Social Security benefits; and income from assets, including defined contribution (DC) pension balances. It also contains aggregate income projections (the sum of income components), but such income flows are only computed for the period after the respondents are projected to become entitled to Social Security benefits. The tax model applies to all years, including those before entitlement for Social Security benefits. The model is therefore solely based on projections of income components; aggregate income variables are not utilized in the computations.

The tax model is based on 1998 tax laws. With two exceptions, we assume that fiscal amounts (thresholds, standard deductions, exemptions) will continue to be adjusted

according to the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI). The first exception is the Social Security Contribution Base, above which no OASDI contributions are made. This base, $68,400 in 1998, is assumed to increase in proportion with projections in the Social Security average wage index. The second exception relates to the computation of the taxable Social Security benefits. In 1998, up to half of Social Security benefits of a married couple is taxable if total income (defined according to the rules specified in the law) exceeds $32,000, and up to 85 percent is taxable if total income exceeds $44,000. The thresholds for single individuals are $25,000 and $34,000, respectively. These thresholds are not indexed and will thus remain the same throughout future years.

For years prior to 1998, the model assumes that the 1998 laws apply, with discounted monetary amounts in accordance with the CPI and Social Security average wage index. This may lead to small discrepancies with actual past tax liabilities.

The tax model only supports calculations for years 1990 through 2031. The lower bound was chosen because MINT data are based on 1990-93 SIPP panels, so that there are no income projections prior to 1990. The upper bound was chosen as the last year for which MINT income projections are available. Any attempt to compute taxes outside the supported range results in abortion of the SAS program, with an informative error message.

5.3.1. Income from Assets

Income from assets is approximated in MINT as the annuity amount a family could purchase if it annuitized 80 percent of its financial assets. Two annuity flows are available. The first (variables incu1980-incu2031) are based on ' unisex' lifetables which only account for differential remaining longevity by age, using 1990 lifetables; the second (variables inci1980-inci2031) are based on ' multivariate' lifetables which account for differential longevity by age, sex, race, education, and calendar time.

Assets include both tax-sheltered wealth (IRAs, Keoghs, and DC pension wealth), and after-tax savings. Any cash flow from tax-sheltered assets, whether in the form of withdrawal or interest/dividend, is taxable. Interest and dividend from after-tax savings are taxable as ordinary income; withdrawals of the principle may be subject to capital gains taxation.

The information in the MINT data is insufficient to determine how much income from assets is taxable. The tax model therefore adopts a very crude rule of thumb: a constant fraction of income from assets is taxable. That fraction is modeled as a *user-modifiable parameter*, `gamma`. See source code line 23 in `computax.sas` (Appendix B.4). As directed by the SSA Task Manager, gamma is presently set to 1, i.e., all income from assets is assumed to be taxable. As stated above, note that the income flows are based on annuitization of 80 percent of assets.

5.3.2. *State and Local Total Taxation for the Elderly*

MINT projects future income flows and demographic status. It does not project future state of residence. It is therefore impossible to compute state income tax liabilities.

State income tax regimes vary widely. Nine states do not levy personal income tax at all; 25 states and the District of Columbia base state income tax on federal AGI; eight states base tax liabilities on federal taxable income; two states base state income tax on federal income tax liability; the remainder specify their own tax basis. Furthermore, states vary in the treatment of public and private pensions, with 25 states fully or partially exempting public pensions, and 36 states fully or partially exempting private pensions. They also differ in tax rates. The top marginal tax rate among states that levy personal income taxes varies from 2.8 percent in Pennsylvania to 12.0 percent in North Dakota. Thus, given any income level, the state income tax burden varies widely.

However, when considering the total state and local tax and fee burden, the differences are much smaller. As shown by Kroes (1998), excluding Alaska, the total state and local tax burden in 1994-95 ranges from 11.0 percent of personal income in New Hampshire to 17.2 percent in New York. The median state is California at 14.1 percent. Alaska—a state that does not levy state personal income tax—stands out with 23.6 percent. In other words, while there is substantial variation across states in personal income tax burden, state and local legislatures tend to compensate through higher or lower county and city taxes, and through various fees.

Against this background, the SSA Task Manager decided that the tax model approximate state and local total tax burden as a constant fraction of federal income tax liability. Given that California is at the median state and local tax burden, and a large state, the default applicable flat percentage rate is the ratio of California taxes (including local taxes and fees) to federal taxes for the elderly population. The fraction is modeled as a *user-modifiable parameter*, `lambda` See source code line 20 in `computax.sas`(Appendix B.4). We estimate this ratio for California to be 0.835. At present, `lambda`is thus set to 0.835, i.e., the `computax`macro returns `statetax`as 83.5 percent of `fedtax` The remainder of this subsection explains how we derived this estimate.

An exact figure for the percentage of California state and local fees per $1,000 personal income among the elderly is not available. Our approximation is based on estimates of tax and fee components and the fraction of income among the elderly which is taxable. Table 5.1 shows the sources of California tax and fees revenues as estimated by Kroes (1997).

Table 5.1. California State and Local Taxes and Fees
(1994-1995; per $1,000 Personal Income)

Fees and assessments	$32.51
General sales tax	29.19
Personal income tax	24.61
Corporate income tax	7.71
Property tax	30.25
Total[a]	141.44

[a]   Note: the sum of components does not add up to the total.
      We contacted the author but did not receive a response.

We assume that fees and assessments, general sales tax and property taxes per $1,000 personal income are roughly the same for the elderly and general population. Corporate income tax is not levied on personal income and is thus not applicable. The personal income tax figure needs to be adjusted downward because not all income among the elderly is subject to California state income taxation. Social Security benefits account for 42 percent of all income for persons age 65 and over, while pension income and annuities account for 19 percent (Baer, 1997). California has a broad-based personal income tax exemption of Social Security benefits, but it allows no exemptions for pensions or other retirement income that is counted in federal AGI. In other words, approximately 58 percent of income among the elderly is subject to California state income taxation. Ignoring progressivity effects, we therefore estimate the total state and local tax and fee burden at approximately $106.22 (= 32.51 + 29.19 + 0.58*24.61 + 30.25) per $1,000 personal income.

We apply the same adjustments to federal income taxation. Kroes (1997) estimates that the federal tax burden for Californians is $219.20 per $1,000 personal income. Ignoring partial taxation of Social Security benefits, the average federal income tax for Californians age 65 and over is $127.14 (= 0.58*219.20) per $1,000 personal income.

For Californians age 65 and over, the ratio of California state and local taxes and fees to federal taxes is thus 0.835 (= 106.22/127.14).

5.4.   Technical Notes

The model is built on the 1998 Federal Income Tax forms, in particular form 1040A and supporting forms, worksheets, and schedules.[47] To a great extent the internals of the model preserve the logic, computational approach, and variable names corresponding to those forms and schedules.[48] Anyone wishing to understand or modify the macro is urged to have copies of the relevant forms at hand. To that end, those forms are reproduced at the end of this guide. Appendix B.5 contains 1998 Form 1940A; Appendix B.6 contains the Social Security Benefits Worksheet; and Appendix B.7 contains Form 1040A Schedule 3.

Taxable Social Security benefits are computed according to the 1040A worksheet for lines 13a and 13b (see the 1040A Instructions at page 27). We note that the income cutoffs here are the only place where dollar amounts on tax forms are not indexed by the assumed CPI.

Filing status is determined by a simple rule. Married couples are assumed to file jointly. Single individuals are assumed to file as "Single." The return is assumed to involve no dependents beyond the head and possibly a spouse. The number of deductions is computed according to the worksheet on the 1998 1040A Instructions at page 31 (see the macro for lines A20a and A21).

Taxable income (A24) is then simply computed as AGI less the value of the exemptions and the deductions (properly computed for the age of the head and spouse). Given this computed value for Taxable Income (and its assumptions), federal taxes are then computed using the formulas provided with the 1040 instructions. They are within rounding error of the values in the 1040A tax tables. Using the formulas results in macro which is shorter and easier to maintain (i.e., update when the tax law changes). In particular, the macro proceeds using the break-points for the brackets and the tax rates for income within the brackets.

The macro then computes FICA (OASDI and HI) taxes. The sum of these two taxes is returned in the variable `ficatax`(it would be simple to break out the two taxes if desired). The computations are based on earned income. We note that FICA is the only place where separate income for head and spouse is required to compute taxes.

Finally, the macro computes an approximation to total state tax payments, `statetax`, as user-modifiable parameter `lambda`times federal income tax liability,

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[47] We opted for the structure of Form 1040A, rather than 1040, because the assumptions stated above rule out any complication for which Form 1040 would be required. We relax the Form 1040A restriction that taxable income must be less than $50,000 by using tax rate schedules, rather than tax tables.

[48] Variables prefixed with an "A" correspond to 1998 Form 1040A line numbers; those prefixed with a "W" correspond to Social Security Benefits Worksheet line numbers; those prefixed with a "C" correspond to line numbers on Schedule 3.

`fedtax` This fraction is intended to include all sub-federal taxes, including state income taxes, state sales taxes, and sub-state (local; i.e. county, city, etc.) taxes.

5.5. Customization

The tax model may be readily customized to support alternative assumptions on (future) tax regimes. We highlight three aspects and illustrate modifications.

5.5.1. Taxation of Income from Assets

As explained above, MINT estimates income from assets as the annuity flow that a family could purchase if it annuitized 80 percent of its financial assets. Since insufficient information is available to determine how much income from assets is taxable, the tax model adopts a very crude rule of thumb: a constant fraction of income from assets is taxable. That fraction is modeled as a user-modifiable parameter, gamma. This parameter is currently set to one, i.e., all income from assets is assumed to be taxable (source code line 23 in computax.sas):

```
%let gamma=1;
```

This parameter may be modified by the user. For example, to assume that 75 percent of asset income is taxable, change line 23 to:

```
%let gamma=0.75;
```

5.5.2. State and Local Total Taxation

As explained above, the tax model approximates state and local total tax burden—including state and local personal income tax, sales tax, property tax, and fees—as a constant fraction of federal income tax liability. The fraction is specified as a user-modifiable parameter, lambda. This parameter is currently set to 0.835, i.e., the computaxmacro returns statetaxas 83.5 percent of fedtax(line 20 of the computaxmacro):

```
%let lambda=0.835;
```

This parameter may be modified by the user. For example, to assume that the state and local total tax burden amounts to 60 percent of the federal tax liability, change line 20 to:

```
%let lambda=0.6;
```

5.5.3. Partial Privatization of Social Security

Social Security's OASI program currently offers a benefit flow which may be partially taxable, as programmed in the tax model. Several reform proposals

introduce individual savings accounts into the Social Security program, much like IRAs. To evaluate the after-tax consequences of such proposals, the tax model must be modified to account for income from such individual savings accounts. The proper modification depends on the proposed taxation regime. Consider the following options.

1. Income from individual savings accounts is treated in the same manner as OASI benefits. Under this regime, add estimated income flows from individual savings accounts to OASI benefits, captured by temporary variable `css`. See lines 80-81 of the `computax`macro.

2. Income from individual savings accounts is treated in the same manner as DC pension income. MINT captures income from DC pension accounts through income from assets, part or all of which may be taxable. However, the fraction of income from assets which stems from DC pension accounts is entirely taxable. To treat income from individual savings accounts in the same manner as DC pension income, add estimated income flows from individual savings accounts to temporary variable `cra`, i.e., do not multiply the income by parameter `gamma`. See line 77 of the `computax`macro.

3. Income from individual savings accounts is treated in the same manner as DB pension income. Under this regime, add estimated income flows from individual savings accounts to DB pension benefits, captured by temporary variable `cdb`. See lines 73-74 of the `computax`macro. This treatment is equivalent to treatment like DC pension income.

4. Income from individual savings accounts is exempt from federal income taxation. Under this regime, omit income from individual savings accounts from the tax model.